(19) World Intellectual Property Organization

International Bureau





(43) International Publication Date 9 June 2005 (09.06.2005)

PCT

(10) International Publication Number WO 2005/052135 A1

(51) International Patent Classification7:

C12N 1/21

(21) International Application Number:

PCT/KR2004/001210

(22) International Filing Date: 20 May 2004 (20.05.2004)

(25) Filing Language:

Korean

(26) Publication Language:

English

(30) Priority Data: 10-2003-0084934

> 27 November 2003 (27.11.2003) KR 10-2004-0028105 23 April 2004 (23.04.2004) KR

(71) Applicant (for all designated States except US): KOREA ADVANCED INSTITUTE OF SCIENCE AND TECH-NOLOGY [KR/KR]; 373-1, Guseong-dong, Yuseong-gu, Daejeon 305-701 (KR).

(72) Inventors; and

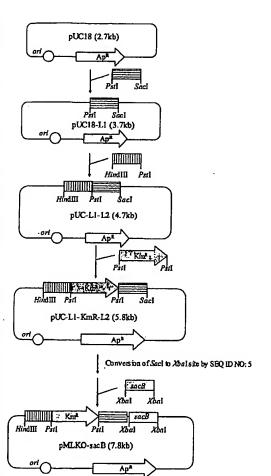
(75) Inventors/Applicants (for US only): LEE, Sang Yup [KR/KR]; EXPO Apt. 212-702, Cheonmin-dong, Yuseong-gu, Daejeon 305-761 (KR). LEE, Sang Jun [KR/KR]; Daewoo Apt. 305-604, Jijok-dong, Yuseong-gu, Daejeon 305-330 (KR).

(74) Agent: LEE, Cheo Young; 4th Floor Kyoung Sung Bldg., 641 Yeoksam-dong, Gangnam-gu, Seoul 135-080 (KR).

(81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG. MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH,

[Continued on next page]

(54) Title: NOVEL RUMEN BACTERIA VARIANTS AND PROCESS FOR PREPARING SUCCINIC ACID EMPLOYING THE SAME



(57) Abstract: The present invention relates to novel rumen bacterial mutants resulted from the disruption of a lactate dehydrogenase gene (ldhA) and a pyruvate formate-lyase gene (pfl) (which are involved in the production of lactic acid, formic acid and acetic acid) from rumen bacteria; a novel bacterial mutant (Mannheimia sp. LPK7) having disruptions of a lactate dehydrogenase gene (ldhA), a pyruvate formate-lyase gene (plf), a phosphotransacetylase gene (pta), and a acetate kinase gene (ackA); a novel bacterial mutant (Mannheimia sp. LPK4) having disruptions of a lactate dehydrogenase gene (ldhA), a pyruvate formate-lyase gene (pfl) and a phosphoenolpyruvate carboxylase gene (ppc) involved in the immobilization of CO2 in a metabolic pathway of producing succinic acid; and a method for producing succinic acid, which is characterized by the culture of the above mutants in anaerobic conditions. The inventive bacterial mutants have the property of producing succinic acid at high concentration while producing little or no organic acids, as compared to the prior wild-type strains of producing various organic acids. Thus, the inventive bacterial mutants are useful as strains for the industrial production of succinic acid.

WO 2005/052135 A1



PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW. SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ,

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IT, LU, MC, NL, PL, PT, RO, SE, SI, GW, ML, MR, NE, SN, TD, TG).

Published:

- with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.